

1 Choose the correct answer between brackets :

[a]  $50 : 300 = \dots\dots\dots$  ( 2 : 5 or  $\frac{1}{5}$  or 1 : 6 or  $\frac{1}{10}$  )

[b]  $\frac{3}{5} : \frac{5}{8} = \dots\dots\dots : 25$  ( 24 or 27 or 15 or 40 )

[c]  $5.5 : 22 = \dots\dots\dots : \dots\dots\dots$  ( 5 : 2 or 4 : 1 or 1 : 4 or 2 : 5 )

[d]  $1.5 : 2.5 = \dots\dots\dots$  ( 5 : 3 or  $\frac{3}{5}$  or 3 : 25 or  $\frac{5}{9}$  )

[e] The ratio between the length of a side of a square and its perimeter =  $\dots\dots\dots : \dots\dots\dots$  ( 1 : 1 or 4 : 1 or 1 : 4 or 1 : 16 )

5

2 Complete each of the following :

[a] The ratio is  $\dots\dots\dots$

[b] In the ratio  $\frac{9}{17}$ , the first term is  $\dots\dots\dots$  and the second term is  $\dots\dots\dots$

[c] A rectangle whose width is 4 cm. and its area is  $24 \text{ cm}^2$ , then the ratio between its length and its width =  $\dots\dots\dots : \dots\dots\dots$

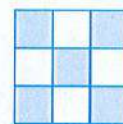
[d]  $\frac{2}{3} : 3\frac{1}{3} = \dots\dots\dots : \dots\dots\dots$  (in the simplest form)

[e] The ratio between the perimeter of an equilateral triangle and its side length is  $\dots\dots\dots : \dots\dots\dots$

5

3 In the opposite figure :

Find the ratio between :



3

[a] The number of coloured squares and the number of all squares.

[b] The number of uncoloured squares and the number of coloured squares.

[c] The number of all squares and the number of uncoloured squares.

4 [a] A school has 200 pupils, if 80 pupils of them are girls, find the ratio between the number of boys and the number of girls.

5

[b] Put each of the following ratios in its simplest form :

(1)  $5 : \frac{5}{4}$

(2)  $2\frac{2}{3} : 1\frac{1}{3}$

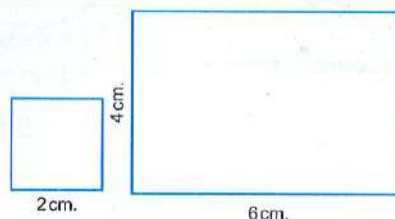
(3)  $\frac{1}{3} : 0.2$

(4)  $\frac{15}{45}$

5 In the opposite figure :

Find the ratio between :

[a] The perimeter of the square and the perimeter of the rectangle.



2

[b] The area of the square and the area of the rectangle.



1 Complete each of the following :

[a]  $\frac{1}{4}$  hour : 20 minutes = ..... : ..... (in the simplest form)

[b]  $4.5 : 9 = \dots : \dots$

[c] P.T. 50 : L.E.  $1\frac{1}{2}$  = ..... : ..... (in the simplest form)

[d] The ratio between the lengths of two sides of a square is ..... : .....

[e] 2 m. : 400 cm. = 1 : .....

5

2 Choose the correct answer between brackets :

[a]  $\frac{14}{26} = \dots : \dots$  (1 : 2 or 7 : 13 or 7 : 6 or 4 : 13)

[b]  $\frac{1}{8}$  kg. : 100 gm. = ..... (4 : 5 or 5 : 2 or 8 : 15 or 5 : 4)

[c] 16 kirats : 1 feddan = ..... : .....

(16 : 1 or 2 : 3 or 3 : 2 or 8 : 3)

[d]  $\frac{2}{3} : \frac{3}{4} = \dots : \dots$  (in the simplest form)

(8 : 9 or 2 : 3 or 2 : 4 or 8 : 7)

[e] 18 hours : one day = ..... : .....

(2 : 9 or 1 : 3 or 3 : 4 or 4 : 3)

5

3 Find each of the following ratios in its simplest form :

[a] 6 days : 2 weeks

[b] 5 dm. : 5 m.

[c] 5 kg. : 7 000 gm.

[d]  $\frac{1}{2}$  L. : 250 mL.

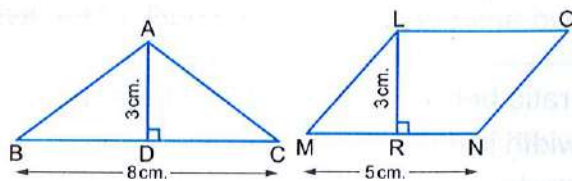
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4 The distance between Adel's house and the sport's club which he joins is 350 metres and the distance between his house and his school is 1.4 kilometres. What is the ratio between the two distances ?

3

5 In the opposite figure :

Find the ratio between the area of the triangle ABC and the area of the parallelogram LMNO



3

7



**1 Complete :**

5

**[a]** If the ratio between Tamer's height and Hend's height is  $9 : 8$  and the difference between their heights is  $20$  cm. , then the height of Hend is ..... cm.

**[b]** The ratio between two numbers =  $\frac{\text{.....}}{\text{.....}}$

**[c]** P.T.  $750 : \text{L.E. } 10 = \text{.....} : \text{.....}$

**[d]** A rectangle of perimeter  $42$  cm. and the ratio between its length and its width is  $5 : 2$  , then its length is ..... cm. and its width is ..... cm.

**[e]**  $300 \text{ gm.} : 1\frac{1}{2} \text{ kg.} = \text{.....} : \text{.....}$  (in the simplest form)

**2** If the ratio between the number of boys and the number of girls in a class is  $2 : 3$  , if the number of boys is  $12$  , find the number of girls.

3

**3 Choose the correct answer between brackets :**

5

**[a]** Two wires , the ratio between their lengths is  $3 : 4$  and the length of the first wire is  $75$  cm. , then the length of the second wire is ..... m. (  $1$  or  $100$  or  $10$  )

**[b]** If the area of a rectangle is  $40 \text{ cm}^2$ . and its length is  $0.8$  dm. , then the ratio between its length and width = ..... : ..... (  $5 : 8$  or  $8 : 5$  or  $5 : 1$  )

**[c]** The ratio between what Yassmien and Marwa has is  $3 : 5$  , if Marwa has  $40$  pounds , then Yassmien has ..... pounds. (  $30$  or  $15$  or  $24$  )

**[d]** The ratio  $12 : 18$  in its simplest form by dividing both terms by ..... (  $2$  or  $3$  or  $6$  )

**[e]** If the sum of two numbers is  $40$  and the ratio between them is  $3 : 5$  , then the smaller one = ..... (  $8$  or  $15$  or  $25$  )

**4** If the sum of two amounts of money is L.E.  $1800$  and the ratio between the two amounts is  $2 : 7$  , find each of the two amounts.

3

**5** The ratio between the length and the width of a rectangle is  $7 : 4$  , if the width is less than the length by  $21$  cm. , then find the area of the rectangle.

4



## 1 Complete each of the following :

[a]  $12 : 18 : 30 = \dots : \dots : \dots$  (in the simplest form)

[b]  $2.5 : 5 : 3.5 = \dots : \dots : \dots$  (in the simplest form)

[c]  $0.5 \text{ km.} : 700 \text{ m.} : 900 \text{ m.} = \dots : \dots : \dots$  (in the simplest form)

[d] If  $a : b = 3 : 5$  and  $b : c = 2 : 5$ , then  $a : b : c = \dots : \dots : \dots$

[e] The ratio between the side length of a rhombus and its perimeter  
 $= \dots : \dots$

5

2 [a] If the ratio between the measures of the angles of a triangle is  $3 : 4 : 5$  Find the measure of each angle of the triangle.[b] The ratio between two numbers is  $5 : 6$ , if their sum is 297 Find the two numbers.

4

## 3 Choose the correct answer between brackets :

[a] If  $a : b = 5 : 6$  and  $b : c = 3 : 4$ , then  $a : c = \dots : \dots$

(3 : 5 or 5 : 3 or 5 : 8 or 8 : 5)

[b]  $\frac{1}{2} : \frac{1}{3} : \frac{1}{4} = \dots : \dots : \dots$

(2 : 3 : 4 or 4 : 3 : 2 or 6 : 4 : 3 or 3 : 4 : 2)

[c] 400 piastres : 12 pounds =  $\dots : \dots$

(1 : 3 or 3 : 1 or 1 : 4 or 2 : 3)

[d] The ratio between three numbers is  $3 : 4 : 7$  and their sum is 70, then the greatest number is  $\dots$  (15 or 35 or 20 or 14)

[e]  $16 : 48 = \frac{1}{\dots}$

(2 or 4 or 5 or 3)

5

4 [a] A piece of land in the form of a triangle, the ratio between its side lengths is  $4 : 6 : 7$ , if the perimeter of this land equals 51 m. Find the lengths of its sides.[b] If the ratio between Adam's money : Nada's money : Seif's money is  $6 : 5 : 2$ , and the difference between Adam's money and Seif's money is L.E. 200 Find the money of each one of them.

4

5 If L.E. 988 is divided among Mohamed, Hany and Amr such that the share of Mohamed is  $\frac{1}{2}$  of that of Hany and the share of Hany is  $\frac{3}{2}$  of that of Amr. Find the share of each of them.

2



1 Choose the correct answer between brackets :

[a] A tractor ploughs 14 feddans in 3.5 hours , then the rate of performance of the tractor = ..... feddans/hour (  $\frac{1}{4}$  or 4 or 10.5 or 7 )

4

[b] A factory produces 4 000 cans for juice during 8 hours , then the rate of the production is ..... cans/hour ( 32 000 or 500 or 5 000 or 4 008 )

[c] A machine produces 500 m. of material in 2 hours and half , then the rate of the production of this machine is ..... m./hour ( 400 or 125 or 1 000 or 200 )

[d] If Omar drinks 14 glasses of milk weekly , then the rate of what he drinks daily is ..... glasses. ( 3 or 7 or 14 or 2 )

2 [a] If a car covers 270 km. in three hours , find the average speed of the car through this trip.

4

[b] The number of pupils in the sixth grade in a school is 260 , the ratio between the number of boys to the number of girls is 6 : 7  
Find the number of each of boys and girls in this grade.

3 [a] If the ratio between Bassem's share : Mina's share : Amgad's share is 3 : 4 : 5 and the share of Bassem is L.E. 24

4

Calculate the share of each of Mina and Amgad.

[b] A factory produces 200 bottles of juice in 10 hours.

Calculate the production rate of the factory.

4 [a] A machine produces 450 kg. of metal in 3 hours. Calculate the rate of production of the machine.

4

[b] If a worker paints a wall of area  $45 \text{ m}^2$  in 5 hours , what is the rate of his work ? and how many square metres does the same worker paint in 7 hours ?

5 [a] The ratio between the heights of two buildings is 3 : 7 , if the second building is 35 m. high. Find the height of the first building.

4

[b] A car consumes 160 litres of petrol to cover a distance of 240 km.  
Find the rate of consumption petrol of that car.



1 Complete each of the following :

[a] The proportion is .....

5

[b]  $\frac{7}{12} = \frac{28}{\dots\dots\dots} = \frac{\dots\dots\dots}{36}$

[c]  $\frac{8}{\dots\dots\dots} = \frac{1}{3} = \frac{\dots\dots\dots}{15}$

[d]  $\frac{\dots\dots\dots}{6} = \frac{12}{18} = \frac{6}{\dots\dots\dots} = \frac{\dots\dots\dots}{3}$

[e] 150 gm. :  $\frac{1}{4}$  kg. = ..... : .....

2 A car consumes 12 litres of petrol in 150 km.

Complete the following proportion table :

2

<b>Petrol in litre</b>	12	.....	36
<b>Distance in km.</b>	150	100	.....

3 Complete the following table to make the corresponding numbers in the two rows proportional :

3

1.3	.....	1	3	.....	5.5	.....
.....	5	10	.....	45	.....	6.7

4 Choose the correct answer between brackets :

5

[a]  $\frac{3}{4} : \frac{2}{3} = \dots\dots\dots : \dots\dots\dots$  ( 9 : 8 or 3 : 2 or 1 : 2 or 3 : 4 )

[b] The ratio between the number of boys and the number of girls in a school is 5 : 6 , if the number of boys is 150 , then the number of girls = ..... ( 30 or 150 or 180 or 210 )

[c] 16 kirats : 2 feddans = ..... : ..... ( 1 : 2 or 2 : 3 or 3 : 4 or 1 : 3 )

[d] If A : B = 2 : 3 , B : C = 4 : 5 , then A : C = ..... : ..... ( 8 : 15 or 15 : 8 or 4 : 5 or 3 : 5 )

[e] The ratio between the side length of the equilateral triangle and its perimeter = ..... : ..... ( 1 : 3 or 3 : 1 or 4 : 1 or 1 : 4 )

5 A machine produces 16 units from a certain product in 4 hours , what is the rate of the machine ? then how long does this machine take to produce 25 units ?

5



**1 Complete :**

- [a] The product of the extremes = the product of .....
- [b] The fourth proportional term in 3 , 6 and 12 is .....
- [c] If 3 ,  $x$  , 12 and 16 are proportional numbers , then  $x = \dots\dots\dots$  and it is called the .....
- [d] If  $\frac{5}{9} = \frac{15}{x}$  , then  $x = \dots\dots\dots$
- [e] If  $\frac{a}{b} = \frac{x}{y}$  , then  $a \times y = \dots\dots\dots \times \dots\dots\dots$

5

**2 Complete the missing number in each of the following proportions :**

- [a] 2 , 11 , 8 , .....
- [b] 5 , 8 , ....., 24
- [c] 9 , ....., 4.5 , 4
- [d] ....., 7 , 24 , 56

4

**3 Choose the correct answer :**

- [a] If  $\frac{a+6}{20} = \frac{1}{2}$  , then  $a = \dots\dots\dots$  ( 6 or 4 or 3 or 10 )
- [b] If the numbers 2 , 3 , 4 and  $x$  are proportional , then the value of  $x = \dots\dots\dots$  ( 5 or 6 or 7 or 8 )
- [c]  $\frac{2}{5} = \frac{\dots\dots\dots}{17.5}$  ( 35 or 10 or 7 or 2.5 )
- [d] 18 hours : one day = ....., ( 18 : 1 or 4 : 3 or 3 : 4 or 2 : 3 )
- [e] If  $3a = 4b$  , then  $\frac{a}{b} = \dots\dots\dots$  (  $\frac{3}{4}$  or  $\frac{2}{3}$  or  $\frac{4}{3}$  or  $\frac{3}{2}$  )

5

**4 [a] A car consumes 20 litres of fuel to cover a distance of 180 km.**

How many litres are needed to cover 540 km.

4

- [b] If the ratio among the heights of three buildings is 3 : 4 : 5 , the height of the first building is 21 m. Calculate the height of the second and the third buildings.

**5 A machine produces 1 400 m. of textile in two hours.**

Calculate the needed time to produce 4 900 m. of textile.

2



**1 Complete :**

- [a] The drawing scale = .....
- [b] If the drawing scale is 1 : 300 , and the length in drawing is 2 cm. , then the length in reality = ..... metres.
- [c] If the drawing length of an object is 3 cm. and its real length is 30 metres , then the drawing scale is .....
- [d] The ratio  $\frac{5}{13}$  , its first term is ..... and its second term is .....
- [e] If the drawing scale is less than 1 , then it refers to .....

5

- 2** [a] The distance between two cities is 20 km. , if the distance between them on a map is 4 cm.  
Find the drawing scale of this map and what does it mean ?

4

- [b] The real length of an insect is 0.4 mm. and its length under a microscope is 2 cm. , find the ratio of magnification.

- 3** Cairo tower is one of the tourists places of Cairo , its height is 187.2 m. , if its height in a picture is 13 cm.

3

- [a] Find the drawing scale.
- [b] If the length of a neighboured building in the same picture is 3.5 cm. Find its real length.

**4 Choose the correct answer between brackets :**

- [a] If the numbers 4 ,  $X$  , 12 and 18 are proportional , then  $X = \dots\dots\dots$   
( 2 or 3 or 6 or 54 )
- [b] If the drawing scale  $> 1$  , it expresses .....  
( minimization or enlargement or congruency )
- [c] 125 piastres : 5 pounds = ..... : .....  
( 1 : 4 or 4 : 1 or 4 : 3 or 1 : 2 )
- [d] If  $\frac{2}{5} = \frac{X}{15}$  , then  $X - 2 = \dots\dots\dots$  ( 4 or 5 or 6 or 15 )

4

- 5** [a] The real distance between Cairo and Alexandria is 220 km. , find the distance between them on a map drawn with a scale 1 : 500 000

4

- [b] A magnified picture of an insect was photographed by a scale 200 : 1  
Find the length of the insect in the picture if its real length is 0.14 mm.

13



- 1 [a] Distribute L.E. 360 among three persons in the ratio 5 : 3 : 4
- [b] The difference between two numbers is 12 and the ratio between them is 5 : 7 Find the two numbers.

4

- 2 Three persons participated in a commercial , the first paid L.E. 15 000 , the second paid L.E. 25 000 and the third paid L.E. 20 000  
At the end of the year , the profit was L.E. 5 520  
Find the share of each of them.

4

- 3 Choose the correct answer :

[a]  $1 - (35\% + 20\%) = \dots\dots\dots\%$  (35 or 40 or 45 or 50)

[b] The ratio between the side length of a square and its perimeter  
=  $\dots\dots\dots : \dots\dots\dots$  (1 : 4 or 4 : 1 or 1 : 2 or 1 : 3)

[c] The antecedent of the ratio 3 : 7 is  $\dots\dots\dots$   
(3 or 7 or 4 or 10)

[d]  $\frac{1}{2}$  hour : 36 minutes =  $\dots\dots\dots : \dots\dots\dots$   
(2 : 3 or 1 : 3 or 5 : 6 or 1 : 8)

4

- 4 A load of apple weighs 330 kg. is distributed among three merchants in which the share of first =  $\frac{2}{3}$  the share of the second , and the share of the second =  $\frac{1}{2}$  the share of the third , calculate the share of each of them from this load.

4

- 5 A man died leaving 192 feddans of land to be distributed among his wife , 2 sons and 3 daughters , the share of the wife is  $\frac{1}{8}$  of the whole land , and the share of the son is twice that of the daughter.  
Find the share of the wife and the share of each son and daughter.

4



**1** Complete :

[a] The percentage is .....

[b]  $\frac{6}{25} = \dots\dots\dots\%$ [c]  $1\frac{3}{4} = \dots\dots\dots\%$ 

[d] 70 % = .....

4

**2** Convert each of the following into a percentage :

[a] 0.07

[b]  $\frac{3}{5}$ [c]  $\frac{9}{20}$ 

[d] 0.6

4

**3** [a] If  $\frac{x}{40} = 35\%$ , find the value of  $x$ 

[b] In a class, there are 48 pupils, if 6 of them are absent.

Find the percentage of absentees and also the percentage of attendance.

4

**4** Choose the correct answer :

[a] If the drawing length is 5 cm. and the real length is 3 m. , then the drawing scale is ..... ( 1 : 60 or 1 : 600 or 1 : 6 000 or 5 : 3 )

[b] 75 % + ..... = 100 % ( 15 % or 35 % or 20 % or 25 % )

[c] A printer prints 12 sheets in 4 minutes , then its rate is ..... sheets/minute. ( 3 or 4 or 5 or 12 )

[d] If  $\frac{x}{15} = \frac{2}{3}$ , then  $x = \dots\dots\dots$  ( 10 or 15 or 30 or 40 )

4

**5** [a] The monthly salary of an employee is L.E. 936 He saved L.E. 117 Find the percentage of what he saved to its salary.

[b] The real distance between Cairo and Banha is 40 km. and the distance between them on the map is 8 cm.

Find the drawing scale for this map.

4



**1** Choose the correct answer between brackets :

[a]  $50\% + \frac{1}{5} = \dots\dots\dots\%$  ( 55 or 70 or 45 or 10 )

[b] If 9 ,  $x$  , 24 and 32 are proportional quantities , then  $x = \dots\dots\dots$   
( 12 or 15 or 3 or 6 )

[c] 45 % of 300 pounds =  $\dots\dots\dots$  pounds  
( 45 or 35 or 150 or 135 )

[d] If a merchant bought a TV set for L.E. 1 000 , then sold it for L.E. 1 200 , then the percentage of profit is  $\dots\dots\dots\%$   
( 20 or 30 or 15 or 45 )

[e] Khaled bought a car in the price L.E. 60 000 and he sold it with profit 5 % , then the selling price of the car is L.E.  $\dots\dots\dots$   
( 61 000 or 62 000 or 63 000 or 65 000 )

**2** [a] A trader sold goods for L.E. 550 with a profit of 10 %

Find the cost price of the goods.

[b] A piece of cloth of 10 metres long is put in water , it shrank by 5 % from its original length. Find its length after shrinking.

**3** [a] The length of a road is 120 km. , it is wanted to pave the road in three months. If 42 % in the first month and 28 % in the second month.

How many kilometres will be paved in the third month ?

[b] Ramy deposited L.E. 3 000 in a bank with an interest 11 %

Find the total amount after one year.

**4** [a] The price of a TV set is L.E. 1 450 , in the sale , its price becomes L.E. 1 160 Find the percentage of the discount.

[b] XYZ is a triangle in which  $XY : YZ : ZX = 4 : 5 : 7$  and  $ZX = 28$  cm. Find the perimeter of the triangle.

**5** A trader bought some goods for L.E. 960 and spent L.E. 20

for transportation , then he sold it with profit 20 %

Find the selling price.



**1** Choose the correct answer between brackets :

5

[a] A parallelogram in which its diagonals are equal in length is called ..... ( rhombus **or** rectangle **or** trapezium )

[b] All sides are equal in length in ..... ( trapezium **or** rhombus **or** parallelogram **or** rectangle )

[c] The diagonals are equal in length and perpendicular in ..... ( square **or** rhombus **or** rectangle **or** parallelogram )

[d] All angles are right in ..... ( parallelogram **or** rhombus **or** rectangle **or** trapezium )

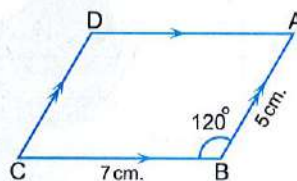
[e] ABCD is a parallelogram , then  $m(\angle A) + m(\angle B) = \dots\dots\dots^\circ$  ( 20 **or** 90 **or** 108 **or** 180 )

**2** In the opposite figure :

ABCD is a parallelogram in which  
 $AB = 5 \text{ cm.}$  ,  $BC = 7 \text{ cm.}$  ,  
 $m(\angle ABC) = 120^\circ$

Without using geometrical instruments

Find :  $m(\angle ADC)$  , the length of  $\overline{DC}$  and the length of  $\overline{AD}$

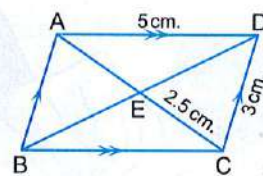


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**3** In the opposite figure :

ABCD is a parallelogram in which  
 $CD = 3 \text{ cm.}$  ,  $EC = 2.5 \text{ cm.}$  ,  $AD = 5 \text{ cm.}$

Find the length of each of :  $\overline{AB}$  ,  $\overline{BC}$  and  $\overline{AC}$



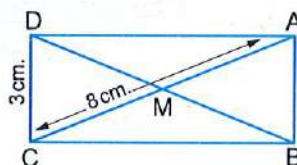
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**4** In the opposite figure :

ABCD is a rectangle in which  $AC = 8 \text{ cm.}$   
 and  $CD = 3 \text{ cm.}$

Find : (1) Length of  $\overline{BD}$

(2) The perimeter of  $\triangle ABM$



3

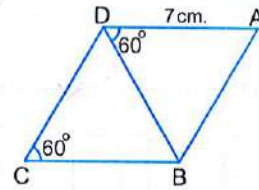


5 [a] In the opposite figure :

ABCD is a parallelogram in which  $m(\angle C) = 60^\circ$   
 $, m(\angle ADB) = 60^\circ$  and  $AD = 7$  cm.

Find :

- (1)  $m(\angle A)$  and  $m(\angle ABD)$
- (2) The type of the triangle ABD according to its sides.
- (3) The perimeter of the shape ABCD

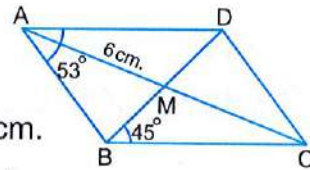


[b] In the opposite figure :

ABCD is a parallelogram in which  
 $m(\angle BAD) = 53^\circ$  ,  $m(\angle DBC) = 45^\circ$  ,  $AM = 6$  cm.

Calculate without using measuring tools each of :

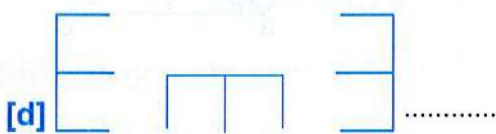
- (1)  $m(\angle ABD)$
- (2)  $m(\angle ADC)$
- (3) AC





**1** Draw the next shape in each pattern in each of the following :

5



**2** Choose the correct answer between brackets :

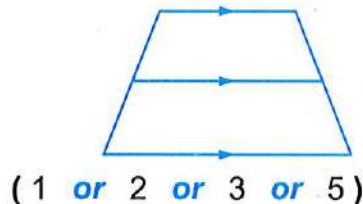
5

[a] The two diagonals are perpendicular and equal in length in .....  
( rectangle **or** square **or** parallelogram **or** rhombus )

[b] ..... (in the same pattern)  
( **or** **or** **or** )

[c] In the opposite figure :

The number of trapezoids is .....



( 1 **or** 2 **or** 3 **or** 5 )



(The description of the pattern is repetition of ..... )

( **or** **or** **or** )

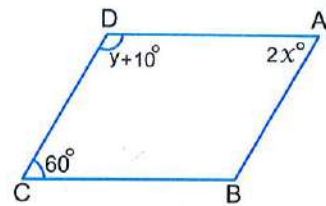
[e] If one angle in a parallelogram is right , then it is called .....

( trapezium **or** square **or** rectangle **or** rhombus )



3 [a] In the opposite figure :

ABCD is a parallelogram , then  
find the value of each of  $x$  and  $y$



4

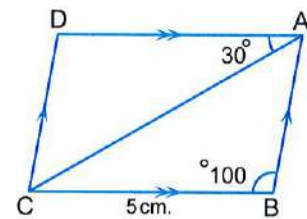
[b] Discover the following pattern  
, then write its description :



(The description of the pattern is repetition of ..... )

4 In the opposite figure :

ABCD is a parallelogram in which  
 $m(\angle B) = 100^\circ$  ,  $m(\angle CAD) = 30^\circ$   
and  $BC = 5$  cm.



3

Find :

[a]  $m(\angle D)$

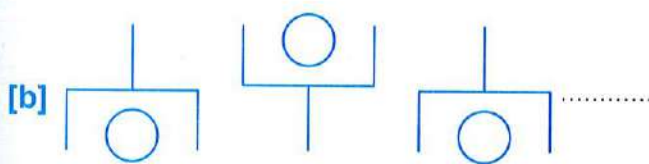
[b]  $m(\angle ACD)$

[c] The length of  $\overline{AD}$

5 Complete in the same pattern :



3





**1** Find the volume of each of the following figures considering the unit of volume is  $\text{cm}^3$  :

3

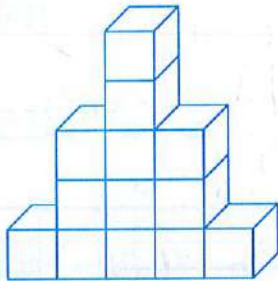


Fig. (1)

The volume = .....  $\text{cm}^3$

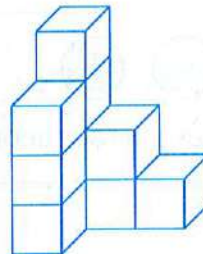


Fig. (2)

The volume = .....  $\text{cm}^3$

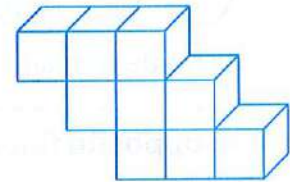


Fig. (3)

The volume = .....  $\text{cm}^3$

**2** Complete each of the following :

5

- [a] In the cuboid , each two opposite faces are ..... and .....
- [b] In the cube , there are ..... edges and ..... vertices.
- [c]  $17 \text{ m}^3 = \text{.....} \text{ dm}^3$
- [d] If the dimensions of a cuboid are equal in length , then it is called .....
- [e] The cubic centimetre is .....

**3** Choose the correct answer between brackets :

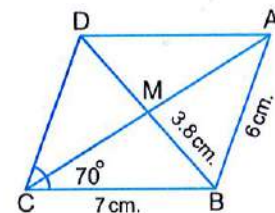
5

- [a] In the parallelogram , the sum of measures of any two consecutive angles = ..... $^\circ$  ( 90 or 180 or 100 or 80 )
- [b] Each of cube and cuboid has ..... faces. ( 8 or 12 or 6 or 4 )
- [c]  $3\ 250 \text{ mm}^3 = \text{.....} \text{ cm}^3$  ( 3.25 or 32.5 or 0.325 or 325 )
- [d]  $7 \text{ dm}^3 = \text{.....} \text{ cm}^3$  ( 0.007 or 7 000 or 700 or 70 )
- [e] In the cube , all the edges are .....  
( different in length or equal in length or parallel or intersecting )

**4** In the opposite figure :

3

ABCD is a parallelogram in which  $AB = 6 \text{ cm}$  ,  
 $BC = 7 \text{ cm}$  ,  $BM = 3.8 \text{ cm}$  ,  $m(\angle C) = 70^\circ$   
Without using geometrical instruments , find :  
 $m(\angle ADC)$  , the perimeter of  $\triangle BCD$





5 [a] Arrange each of the following ascendingly :

$5 \text{ m}^3$  ,  $500\,000 \text{ cm}^3$  and  $50 \text{ dm}^3$

[b] In the opposite figure :

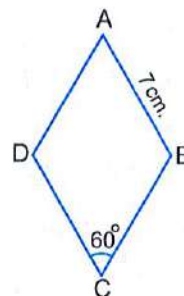
ABCD is a rhombus in which  $m(\angle BCD) = 60^\circ$  ,

$AB = 7 \text{ cm}$ .

Find :

(1) The perimeter of the figure ABCD

(2)  $m(\angle ABC)$





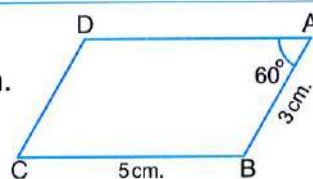
**1** Complete each of the following :

5

- [a] The volume of the cuboid = ..... × height
- [b] The volume of the cuboid whose dimensions are 5 cm. , 6 cm. and 8 cm. is ..... cm<sup>3</sup>
- [c] The volume of a cuboid with base area 88 cm<sup>2</sup> and height 45 cm. is .....
- [d] The base area of the cuboid = .....
- [e] The four angles are right in each of ..... and .....

**2** [a] In the opposite figure :

ABCD is a parallelogram which has AB = 3 cm. , BC = 5 cm. and m (∠ BAD) = 60°



4

- (1) Find : m (∠ ABC)
- (2) Calculate the perimeter of the parallelogram ABCD

- [b] A cuboid-shaped box of dimensions 12 cm. , 6 cm. and 18 cm. was filled with pieces of sweets , each piece in the shape of a cuboid of dimensions 2 cm. , 1 cm. and 3 cm. Find the number of the pieces that filled the box.

**3** Choose the correct answer between brackets :

5

- [a] 6 500 dm<sup>3</sup> = ..... m<sup>3</sup> ( 6.5 or 65 or 650 or 6 500 000 )
- [b] If the volume of a cuboid is 1 800 cm<sup>3</sup> and its base dimensions are 30 cm. and 10 cm. , then its height = ..... cm. ( 9 or 6 or 12 or 15 )
- [c] The number of faces of the cuboid is ..... ( 4 or 6 or 12 or 8 )
- [d] If a cuboid of volume 72 cm<sup>3</sup> , its height is 6 cm. and its length is 4 cm. , then its width = ..... cm. ( 12 or 9 or 6 or 3 )
- [e] Cubic decimetre is a unit for measuring ..... ( length or volume or weight or area )

**4** The sum of dimensions of a cuboid is 240 cm. and the ratio among them is 2 : 3 : 5 Find its volume.

3

**5** 3 600 cm<sup>3</sup> of water was poured in a cuboid-shaped vessel with a square base of side length 20 cm. Find the height of water in the vessel.

3



## 1 Complete :

[a] The volume of the cube = .....  $\times$  .....  $\times$  .....

5

[b] A cube of edge length 6 cm. , its volume = .....  $\text{cm}^3$ .[c] The area of one face of a cube is  $9 \text{ cm}^2$  , then its volume = .....  $\text{cm}^3$ .

[d] If the sum of the lengths of the edges of a cube is 60 cm. , then its volume = .....

[e] If the perimeter of one face of a cube is 8 cm. , then the volume of this cube = .....

## 2 Choose the correct answer between brackets :

[a]  $10 \text{ dm}^3 = \dots \text{ cm}^3$  ( 10 or 100 or 1 000 or 10 000 )

5

[b] The volume of a cuboid is  $120 \text{ cm}^3$  , if its base area is  $24 \text{ cm}^2$  , then its height = ..... cm. ( 5 or 6 or 10 or 12 )

[c] The number of vertices of a cube is ..... ( 8 or 12 or 6 or 4 )

[d] The parallelogram in which two adjacent sides are equal in length is called .....

( a square or a rectangle or a trapezium or a rhombus )

[e] A cuboid with a square base of side length 7 cm. and height 10 cm. , then its volume is .....

(  $49 \text{ cm}^3$  or  $70 \text{ cm}^2$  or  $70 \text{ cm}^3$  or  $490 \text{ cm}^3$  )

## 3 [a] Which is greater ? The volume of a cube of edge length 5 cm. or the volume of a cuboid of dimensions 6 cm. , 5 cm. and 4 cm.

4

[b] A metal cuboid with dimensions 56 cm. , 21 cm. and 7 cm. was melted and converted into small cubes with edge length 14 cm. for each.

Calculate the number of these cubes.

## 4 The inner dimensions of a cuboid-shaped box are 54 cm. , 60 cm. and 30 cm. , it is needed to put inside it cube-shaped packets of biscuits whose edge length is 6 cm.

2

Find the number of packets of biscuits which fill the box.



**5** In the opposite figure :

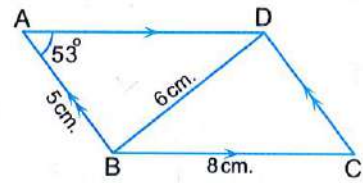
ABCD is a parallelogram in which

$m(\angle BAD) = 53^\circ$ ,  $AB = 5$  cm.

,  $BC = 8$  cm. and  $BD = 6$  cm.

Find :

- (1)  $m(\angle BCD)$
- (2) The perimeter of  $\triangle DBC$





**1 Complete :**

- [a] The litre is a unit for measuring ..... [b]  $4\frac{2}{5}$  litres = .....  $\text{cm}^3$   
 [c] 3 litres = .....  $\text{dm}^3$  [d]  $0.45\text{ m}^3$  = ..... litres  
 [e] 680 litres = .....  $\text{m}^3$

5

**2 Choose the correct answer between brackets :**

- [a] The inner dimensions of a cuboid container is 20 cm. , 20 cm. and 30 cm. , its capacity = ..... litres.  
 ( 0.12 or 1.2 or 12 or 120 )  
 [b]  $\frac{3}{4}$  litre = ..... mL. ( 0.75 or 7.5 or 750 or 75 )  
 [c] Decimetre is a unit for measuring .....  
 ( capacity or volume or length or weight )  
 [d] 38 millilitres = .....  $\text{cm}^3$  ( 38 000 or 3 800 or 380 or 38 )  
 [e] The two diagonals are perpendicular in .....  
 ( rectangle or rhombus or parallelogram or trapezium )

5

- 3** [a] A tin in the shape of a cuboid of internal dimensions are 30 cm. , 25 cm. and 40 cm. is filled with oil. Find the price of the oil if the price of one litre is L.E. 3.5

4

- [b] A cube-shaped tin of inner edge length 40 cm. is full of oil. It is needed to put the oil in a number of bottles each of capacity half a litre. How many bottles are needed ?

- 4** [a] The capacity of a bottle is  $\frac{3}{4}$  litres , is filled with alcohol.

It is wanted to put this amount in small bottles which the capacity of each is  $25\text{ cm}^3$  Find the number of small bottles.

3

- [b] 3.6 litres of water are poured in a cuboid-shaped vessel with a square-base of side length 20 cm. Find the height of water in the vessel.

- 5** [a] A building worker used 1 500 bricks to build a wall.

Calculate the volume of the wall in  $\text{m}^3$  if the brick is in the shape of a cuboid of dimensions 0.25 m. , 0.12 m. and 0.06 m.

3

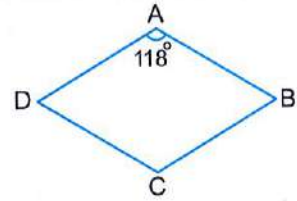
- [b] Find the volume of cube whose edge length is equal to the side length of an equilateral triangle of perimeter 18 cm.



1 Complete each of the following :

5

- [a] The data that describe the conditions of individuals using words is called .....
- [b] The data that consists of numbers to represent a certain phenomenon is called .....
- [c] If the dimensions of a cuboid are equal , then it is called a .....
- [d] In the opposite figure :  
ABCD is a rhombus in which  $m(\angle A) = 118^\circ$   
, then  $m(\angle B) = \dots\dots\dots^\circ$
- [e] The birth date is ..... data.



2 Choose the correct answer between brackets :

5

- [a] The following data are descriptive except .....  
( the favorite colour **or** birth place **or** age **or** blood species )
- [b] The following data are quantitative except .....  
( length **or** weight **or** age **or** blood species )
- [c] If the edge length of a cube = 4 cm. , then its volume = .....  $\text{cm}^3$   
( 6 **or** 8 **or** 24 **or** 64 )
- [d] The volume of the cuboid is  $36 \text{ cm}^3$  , with its base is square shaped of side length 3 cm. , then its height = ..... cm.  
( 108 **or** 12 **or** 9 **or** 4 )
- [e] 850 millilitres = ..... litres.  
( 0.85 **or** 85 **or** 0.085 **or** 850 000 )

3 Read the written data on the opposite bottle ,  
then classify them into descriptive data  
and quantitative data.

2






- 4 The base of a cuboid is a rectangle whose perimeter = 80 cm. and the ratio between its length to its width = 5 : 3 , calculate its volume if its height is 7 cm.

4

- 5 [a] The opposite card is a membership card of a library , answer :

- (1) What are the quantitative data ?  
 (2) What are the descriptive data ?

Egyptian Library	
Name : .....	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Personal photo</div> <small>Library stamp</small> 
Age : .....	
Job : .....	
Membership No. : .....	

4

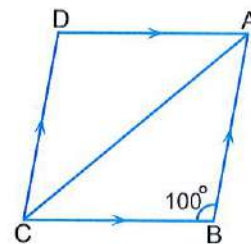
- [b] In the opposite figure :

ABCD is a parallelogram in which

$$m(\angle BAC) = m(\angle DAC), m(\angle B) = 100^\circ$$

Find :

- (1)  $m(\angle D)$   
 (2)  $m(\angle BAC)$





- 1 Bassem wants to know the favourite sport for the students in his classroom.

4

The number of students is 36 students.

He asked everyone, the answers were :

(volleyball - football - football - swimming - tennis - football - walking - swimming - volleyball - walking - football - tennis - football - football - gymnastics - walking - tennis - tennis - swimming - football - swimming - walking - football - walking - tennis - basketball - swimming - swimming - football - basketball - football - walking - swimming - football - football - swimming)

[a] Form a frequency table for this data.

[b] What is the number of students who prefer tennis ?

- 2 The following table shows the produced amount of vegetables in tons by a farm in a year :

4

Vegetable	Tomato	Eggplant	Green beans	Potato	Cucumber	Total
No. of tons	20	14	5	25	16	80

- [a] Which is the vegetable that has the greatest number of produced tons ? and what is the order of it among the produced vegetables if you arrange them according to the produced amount of each kind ascendingly ?
- [b] How many tons of tomato are produced ? And what is the percentage of it ?

- 3 [a] In the opposite figure :

4

XYZL is a parallelogram in which

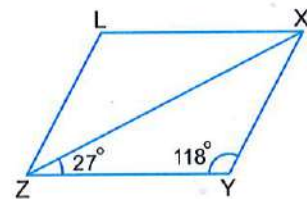
$m(\angle Y) = 118^\circ$ ,  $m(\angle XZY) = 27^\circ$ , find :

(1)  $m(\angle YXZ)$

(2)  $m(\angle LZX)$

(3)  $m(\angle LXZ)$

(4)  $m(\angle L)$



- [b] A metallic cube is of edge length 30 cm. , it is melted to be used in manufacture and it is converted into cuboid in which the dimensions of the base are 40 cm. and 25 cm. Calculate its height.



**4** Here are the evaluations of 20 students in mathematics :

good	pass	pass	good	weak
excellent	very good	pass	very weak	very good
good	weak	good	pass	pass
good	pass	weak	good	pass

**[a]** Form a frequency table of this data.

**[b]** What is the most common evaluation among the students ?

**[c]** What is the least common evaluation among the students ?

**5** Choose the correct answer from those given :

**[a]** The sum of measures of any two consecutive angles in a parallelogram = .....° ( 60 *or* 90 *or* 108 *or* 180 )

**[b]** The following data are quantitative except .....  
( age *or* weight *or* blood type *or* length )

**[c]** 6 litres = ..... dm<sup>3</sup> ( 6 *or* 60 *or* 600 *or* 6 000 )

**[d]** If one of the angles of a parallelogram is right , then it is called .....  
( square *or* rectangle *or* rhombus *or* trapezium )



1 Complete each of the following :

5

- [a] The difference between the greatest value and the smallest value in a set of individuals is called .....
- [b] If the marks of 4 pupils in a test are 26 , 30 , 13 and 29 , then the range of these marks = .....
- [c] If the values of a frequency distribution lie between 10 and 60 , then the range of this distribution = .....
- [d] If one of the angles of a parallelogram is right , then it will be called .....
- [e] A cuboid with a square base of side length 4 cm. and height 5 cm. , then its volume = .....  $\text{cm}^3$

2 The following data shows the number of holidays that 40 workers of a factory have got during a year :

3

12	27	14	25	13	22	14	26	11	15
30	21	15	22	23	28	16	21	30	25
27	16	22	20	26	30	21	15	16	23
15	30	28	21	24	15	27	30	21	28

Form a frequency table by using the sets 11 – , 16 – , 21 – , ... , the length of each is 5 days , then find the number of workers who have got 21 days or more in the year.

3 The following table gives the frequency distribution of the daily wages in L.E. for 50 workers :

4

Set of wages	10 –	12 –	14 –	16 –	18 –	20 –	22 –
No. of workers	6	7	12	10	9	4	2

- [a] Find the number of workers whose wages are less than L.E. 16
- [b] What is the percentage of workers whose wages are L.E. 20 or more ?



- 4 The following table gives the frequency distribution of the marks of 40 pupils in mathematical examination :

Sets	10 –	20 –	..... –	40 –	50 –	Total
Frequency	4	8	12	10	.....	40

[a] Complete the table.

[b] Find the number of pupils whose marks are less than 40 and its percentage.

- 5 Choose the correct answer from those given :

[a] A cube of edge length 3 cm. , then its volume = .....  $\text{cm}^3$

( 3 or 9 or 27 or 36 )

[b] ..... is a unit of capacity.

( Metre or Kilogram or Litre or Day )

[c] ABCD is a parallelogram in which  $m(\angle A) = 100^\circ$  , then

$m(\angle C) = \dots\dots\dots$  (  $60^\circ$  or  $80^\circ$  or  $100^\circ$  or  $180^\circ$  )

[d] If the volume of a cuboid is  $27 \text{ cm}^3$  and the area of its base is  $9 \text{ cm}^2$

, then its height is ..... cm. ( 3 or 4 or 5 or 6 )



- 1** The following table gives the frequency distribution of the ages of 40 students in a school :

3

The age	6 –	8 –	10 –	12 –	14 –	Total
Number of students	8	9	6	12	5	40

Draw the frequency curve for this distribution.

- 2** The following table shows the marks of 100 pupils in maths :

4

Marks	20 –	30 –	40 –	50 –	Total
Number of pupils	15	30	40	15	100

- [a]** What is the number of the pupils who got less than 40 marks ?  
**[b]** Draw the frequency curve for this distribution.

- 3** Choose the correct answer from those given :

5

- [a]** 0.3 litre = ..... millilitres. ( 3 or 30 or 300 or 3 000 )  
**[b]** If the range of frequency distribution is 23 and the lowest value is 35 , then the highest value is ..... ( 12 or 29 or 58 or 67 )  
**[c]** The volume of the cuboid whose dimensions are 5 cm. , 4 cm. and 3 cm. is ..... cm<sup>3</sup> ( 12 or 20 or 30 or 60 )  
**[d]** Number of edges of the cube is ..... ( 6 or 8 or 12 or 24 )  
**[e]** The centre of the set which its lower limit = 4 and its upper limit = 10 is ..... ( 7 or 14 or 40 or 80 )

- 4 [a]** The sum of areas of all faces of a cube is 54 cm<sup>2</sup>. Calculate its volume.

4

- [b]** 72 litres of molasses are needed to be put in tins of the same kind , each has a rectangular-shaped base with dimensions 18 cm. and 10 cm. , and height 16 cm. How many tins are needed ?

- 5** The following table shows the ages of visitors to an exhibition within an hour of the day :

4

Visitor's age	10 –	20 –	30 –	40 –	50 –	Total
Number of visitors	6	9	12	10	8	45

- (1)** What is the number of visitors whose ages are less than 40 years ?  
**(2)** Draw the frequency curve for this distribution.



# Summary of unit 1



**The meaning of ratio :** A ratio is a way of comparing between two quantities by division.

## The properties of ratio

### Property 1

The ratio has the same properties of the **fraction** as **reduction** , **simplifying** and **comparison**.

### Property 2

In its simplest form , the two terms of the ratio should be two **whole numbers** as **small as possible**.

### Property 3

To compare two quantities using ratio , they must have the same unit.

### Property 4

The ratio between two quantities has no units.

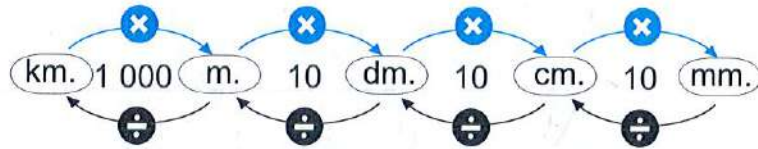
## Remarks

- ① In an equilateral triangle, the ratio of the side length to the perimeter is  $1 : 3$
- ② In a square, the ratio of the side length to the perimeter is  $1 : 4$ .
- ③ In a rhombus, the ratio of the side length to the perimeter is  $1 : 4$
- ④ In a square, the ratio of any side length to another side length is  $1 : 1$
- ⑤ In a rhombus, the ratio of any side length to another side length is  $1 : 1$



## Measuring units and their converting rules

### The length units

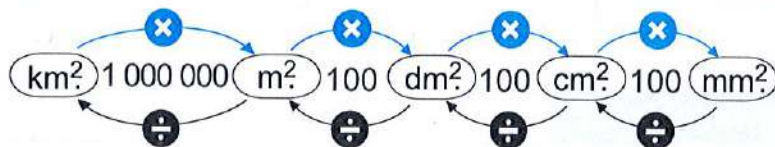


For example :

$$\bullet 5 \text{ km.} = 5 \times 1\,000 = 5\,000 \text{ m.}$$

$$\bullet 6\,000 \text{ cm.} = 6\,000 \div 100 = 60 \text{ m.}$$

### The area units

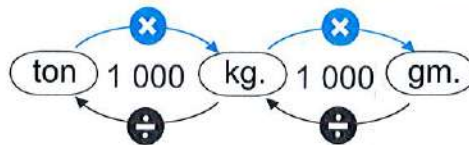


For example :

$$\bullet 3 \text{ km}^2 = 3 \times 1\,000\,000 = 3\,000\,000 \text{ m}^2$$

$$\bullet 1\,000 \text{ cm}^2 = 1\,000 \div 100 = 10 \text{ dm}^2$$

### The weight units

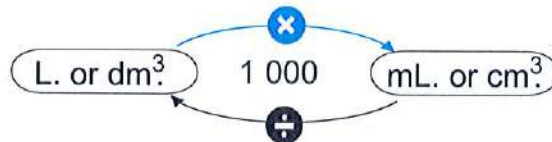


For example :

$$\bullet 6 \text{ kg.} = 6 \times 1\,000 = 6\,000 \text{ gm.}$$

$$\bullet 20\,000 \text{ kg.} = 20\,000 \div 1\,000 = 20 \text{ tons.}$$

### The capacity units



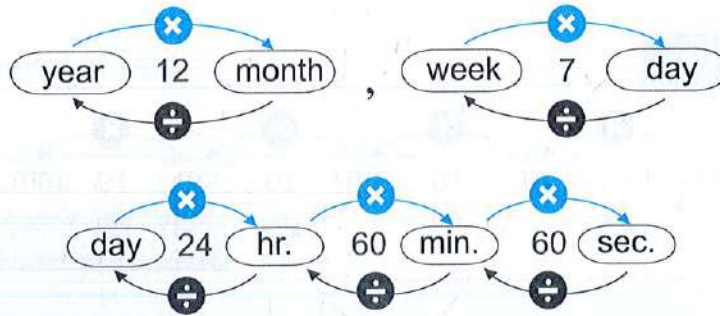
For example :

$$\bullet 5 \text{ L.} = 5 \times 1\,000 = 5\,000 \text{ cm}^3$$

$$\bullet 7\,000 \text{ cm}^3 = 7\,000 \div 1\,000 = 7 \text{ L.}$$



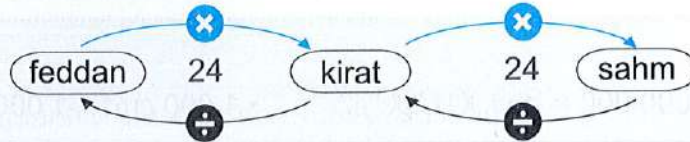
**The time units**



For example :

- 5 hr. =  $5 \times 60 = 300$  min.
- 49 days =  $49 \div 7 = 7$  weeks

**Units of cultivated lands**



For example :

- 2 feddans =  $2 \times 24 \times 24 = 1152$  sahms
- 120 kirats =  $120 \div 24 = 5$  feddans

**The money units**



For example :

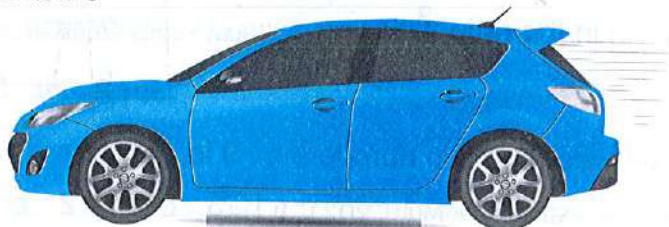
- L.E. 50 =  $50 \times 100 =$  P.T. 5 000
- P.T. 1 000 =  $1\ 000 \div 100 =$  L.E. 10



A rate is a ratio of two quantities with different measurement units.

For example : If a car travels **300 km.** in **5 hours**, the rate is

$$\frac{300 \text{ km.}}{5 \text{ hours}} \text{ ( km. and hour are different measurement units ).}$$



• The rate per 1 hour is  $\frac{300 \text{ km.}}{5 \text{ hours}} = \frac{60 \text{ km.}}{1 \text{ hour}} = 60 \text{ km./hr.}$



# General Exercise on Unit One

"Collected from directorates' exams"

Answer the following questions :

**1** Choose the correct answer from those given :

(1) The first term in the ratio  $\frac{3}{5}$  is ..... "Mattay - Menia - Multi. 2021"

( 8 or 3 or 5 or 15 )

(2) The ratio between the two numbers 6 : 9 is .....

"Abo Kebeer - Sharkia - Multi. 2021" ( 1 : 3 or 1 : 2 or 2 : 3 or 3 : 1 )

(3) The ratio between the two numbers 1.6 : 1.8 = ..... : .....

"El-Tur - South Sinai - 2019" ( 1 : 4 or 8 : 9 or 3 : 8 or 1 : 16 )

(4) 5 pounds : 350 piastres in the simplest form is .....

"Waraak - Giza - Multi. 2021" ( 10 : 7 or 5 : 350 or 50 : 350 or 7 : 5 )

(5)  $\frac{2}{3} : 3 \frac{1}{3} = \dots : \dots$

"Port Said - Port Said - 2019"

( 1 : 2 or 1 : 3 or 2 : 3 or 1 : 5 )

(6) The ratio between the side length of a square and its perimeter = .....

"Maghagha - Menia - Multi. 2021" ( 1 : 3 or 2 : 4 or 1 : 4 or 2 : 3 )

(7) The ratio between the side length of an equilateral triangle and its perimeter = ..... : .....

"Aswan - Aswan - 2020"

( 1 : 1 or 1 : 3 or 1 : 4 or 1 :  $\pi$  )

(8) If  $A : B = 2 : 3$  and  $B : C = 3 : 5$ , then  $A : C = \dots$

"El-Shorouk - Cario - Multi. 2021" ( 3 : 5 or 2 : 3 or 2 : 5 or 6 : 9 )

(9) If  $a : b = 2 : 3$ ,  $b : c = 6 : 7$ , then  $a : c = \dots$  "Souhag - Souhag - 2019"

( 7 : 4 or 4 : 7 or 12 : 7 or 6 : 7 )

(10) In the opposite figure :

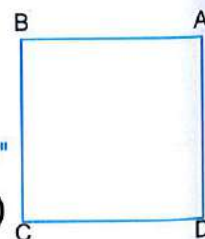
ABCD is a square

, then the ratio between

$AB : CD = \dots : \dots$

"Omrana - Giza - 2020"

( 1 : 1 or 1 : 2 or 1 : 3 or 2 : 1 )





(11) 3 000 gm. : 8 kg. = ..... "New Cairo - Cairo - Multi. 2021"

( 3 : 8 or 8 : 3 or 30 : 8 or 3 : 80 )

(12) A car covers 240 km. in 3 hours , then the car speed is ..... km./hour.

"Luxor - Luxor - 2019" ( 60 or 80 or 120 or 90 )

(13) The ratio between 12 kirats and 1.25 feddan = ..... : .....

"West - Alexandria - Multi. 2021" ( 1 : 2 or 2 : 1 or 2 : 5 or 5 : 2 )

(14)  $\frac{1}{8}$  day : 6 hours :  $\frac{1}{2}$  day = ..... : ..... : .....

"Gharbia - Gharbia - 2019" ( 1 : 2 : 6 or 1 : 2 : 4 or 1 : 2 : 3 or 3 : 2 : 1 )

(15) Consequent of the ratio 3 : 5 is ..... "West Mansoura - Dakahlia - Multi. 2021"

( 3 or 5 or 2 or 8 )

(16) The ratio between 18 months , 2 years is ..... : .....

"Deshna - Qena - 2020" ( 1 : 9 or 3 : 4 or 10 : 9 or 27 : 30 )

(17)  $\frac{5}{2} : \frac{2}{7} =$  ..... : .....

"Suez - Suez - Multi. 2021"

( 5 : 7 or 35 : 4 or 2 : 7 or 5 : 2 )

(18) A car consumes 20 litres of petrol to cover a distance 250 km. , then the rate consumption of the car is .....

"Banha - Kalyoubia - 2019"

( 0.08 L./km. or 0.8 L./km. or 8 L./km. or 80 L./km. )

(19) If the ratio among the measurements of the angles of a triangle is 2 : 3 : 4 , then the measurement of the smallest angle is .....°

"Gharbia - Gharbia - 2020" ( 40 or 60 or 80 or 180 )

(20) The ratio between the number of boys and the number of girls in a certain school is 6 : 5 , if the number of boys is 180 , then the number of girls = .....

"Sheikh Zayed - Giza - Multi. 2021" ( 150 or 30 or 120 or 110 )

**2 Complete each of the following :**

( 1 ) When comparing between two quantities or numbers of the same type and same units the resulting fraction is called .....

"West - Alexandria - 2019"

( 2 ) The comparing between two quantities of different kind is .....

"Damietta - Damietta - 2020"



## General Exercise

- (3) The ratio between two numbers =  $\frac{\dots}{\dots}$  "Maadi - Cairo - 2019"
- (4) The ratio between the two numbers  $125 : 25 = \dots : \dots$   
(in the simplest form) "Arment - Luxor - 2020"
- (5)  $12 : 18 : 36 = \dots : \dots : \dots$  (in the simplest form)  
"Omrania - Giza - 2019"
- (6)  $\frac{5}{4} : 2 = \dots : \dots$  (in the simplest form) "Belbeis - Sharkia - 2019"
- (7)  $\frac{1}{4} : \frac{1}{3} : \frac{1}{2} = \dots : \dots : \dots$  (in the simplest form)  
"Ismailia - Ismailia - 2019"
- (8) If the ratio  $a : b = 4 : 3$  and the ratio  $b : c = 2 : 3$ ,  
then the ratio  $a : b : c = \dots : \dots : \dots$   
"Gharbia - Gharbia - 2019"
- (9) Half km. : 250 metres =  $\dots : \dots$  (in the simplest form)  
"South - Suez - 2019"
- (10) 3 weeks : 24 days =  $\dots : \dots$  (in the simplest form)  
"Nasr City - Cairo - 2019"
- (11) The ratio between child's age and his father's age is  $1 : 10$  and the age of  
the child is 6 years, then the father's age =  $\dots$  years.  
"Banha - Kalyoubia - 2019"
- (12) If the sum of two numbers = 180 and the ratio between them is  $2 : 7$ ,  
then the smaller number =  $\dots$  "Ismailia - Ismailia - 2020"
- (13) An agricultural tractor ploughs 28 feddans in 4 hours, then its rate of  
performance is  $\dots$  "East Zagazig - Sharkia - 2020"
- (14) A computer colour printer prints 12 papers each 4 minutes, then the rate  
of work of this printer =  $\dots$  papers/minutes. "Rashid - Beheira - 2019"
- (15) If the ratio between the two dimensions of a rectangle is  $3 : 4$  and its  
perimeter is 140 cm., then its area =  $\dots$  cm<sup>2</sup>.  
"Montaza - Alexandria - 2020"

### 3 Answer the following :

- (1) If the ratio between the weight of Hani and the weight of Ahmed is  $5 : 6$ ,  
if the weight of Ahmed is 60 kilograms.  
Calculate the weight of Hani. "West - Alexandria - 2019"



- (2) If the ratio between the length of two pieces of cloth is 6 : 8 and the sum of their lengths is 126 cm. , calculate the length of each piece.  
"Omrana - Giza - 2020"
- (3) In a school , if the number of students is 560 students , the number of girls  $\frac{3}{5}$  the number of boys , find the number of each of boys and girls.  
"Belbies - Sharkia - 2019"
- (4) If the ratio between Hadir's weight and Basma's weight is 5 : 6 and the difference between their weights is 10 kg. Calculate the weight of each of them.  
"Shebien EL-Koum - Monofia - 2019"
- (5) The ratio between the length and the width of a rectangle is 9 : 5 , if the perimeter of the rectangle is 56 cm. Find out the length and the width , then calculate its area.  
"East Mansoura - Dakahlia - 2020"
- (6) The number of pupils in a primary school in the 1<sup>st</sup> , the 2<sup>nd</sup> and the 3<sup>rd</sup> grades is 240 pupils , if the ratio among the three grades is 5 : 4 : 3 , calculate the number of pupils in each grade.  
"El-Montaza - Alexandria - 2020"
- (7) The ratio among the lengths of the sides of a triangle is 2 : 3 : 4 and the perimeter of the triangle = 36 cm.  
Calculate the length of each side of the triangle. "Souhag - Souhag - 2019"
- (8) If the ratio between the measures of the angles of a triangle is 1 : 2 : 3 , then find the measure of each angle of the triangle.  
"EL-Dokki - Giza - 2020"
- (9) Ahmed studies 21 hours weekly , find the rate of his studying daily.  
"Nasr City - Cairo - 2020"
- (10) A car covers 300 km. in 4 hours another car covers 65 km. in 50 minutes , which of the two cars is faster ?  
"Ismailia - Ismailia - 2020"



# Summary of unit 2



**Proportion** is an equality of two or more ratios.

## The properties of proportion

### Property 1

If we multiply (or divide) each of the two terms of a ratio by the same non-zero number, then the resultant ratio is equal to the first ratio and they together form a proportion.

### Property 2

The product of extremes = the product of means

$$\text{Drawing scale} = \frac{\text{Length in drawing}}{\text{Length in reality}}$$

### Notice that :

Both lengths should have the same units.

## Remarks

If the **drawing scale** is

Less than 1 ( $< 1$ )

then it refers to **minimization (reduction)**  
(length in drawing  $<$  length in reality)

Greater than 1 ( $> 1$ )

then it refers to **enlargement (magnification)**  
(length in drawing  $>$  length in reality)

**Proportional division** is to divide anything (money, land, weights, ..... ) according to a given ratio.



- A **percentage** is a ratio its second term is 100
- A **percentage** means "**per hundred**" or "**hundredths**".

Profit = selling price (S.P.) – cost price (C.P.)

The percentage of profit =  $\frac{\text{Profit}}{\text{C.P.}} \times 100 \%$

Loss = cost price (C.P.) – selling price (S.P.)

The percentage of loss =  $\frac{\text{Loss}}{\text{C.P.}} \times 100 \%$

### Notice that :

The **cost price** = buying price + expenditures (where expenditures may be maintenance , transportation , insurance , rentals , ... etc.)

### Remarks

- ① When we say that the **profit** is 20 % , we mean that :  
If the **cost price** (C.P.) = L.E. 100 , then the **profit** = L.E. 20 and the **selling price** (S.P.) = L.E. 120
- ② When we say that the **loss** is 15 % , we mean that :  
If the **cost price** (C.P.) = L.E. 100 , then the **loss** = L.E. 15 and the **selling price** (S.P.) = L.E. 85
- ③ When we say that the **interest** is 8 % , we mean that :  
If we **deposit** L.E. 100 in a bank , then the **interest** = L.E. 8 and the **amount of this money after one year** = L.E. 108
- ④ When we say that the **discount** is 25 % , we mean that :  
If the **price before the discount** (The marked price) is L.E. 100 , then the **discount** = L.E. 25 and the **price after the discount** (The discount price) is L.E. 75



# General Exercise on Unit Two

"Collected from directorates' exams"

Answer the following questions :

**1** Choose the correct answer from those given :

(1) If  $\frac{2}{3} = \frac{x}{9}$ , then  $x = \dots\dots\dots$  "Heliopolis - Cairo - Multi. 2021"

( 4 or 6 or 8 or 10 )

(2) If the numbers 4 ,  $x$  , 12 , 18 are proportional , then  $x = \dots\dots\dots$

"East Zagazig - Sharkia - Multi. 2021" ( 2 or 3 or 6 or 54 )

(3) The percentage is a ratio its second term is  $\dots\dots\dots$

"El-Tur - South Sinai - 2019" ( 10 or 100 or 1 000 or 10 000 )

(4)  $\frac{4}{5} = \dots\dots\dots$  % "Omrania - Giza - Multi. 2021" ( 20 or 40 or 50 or 80 )

(5)  $1 - 25\% = \dots\dots\dots$  % "West - Alexandria - Multi. 2021"

( 25 or 50 or 65 or 75 )

(6) In a class the percentage of girls is 46 % from the total number of pupils , then the percentage of boys =  $\dots\dots\dots$  %

"Dokki - Giza - 2020" ( 46 or 54 or 100 or 146 )

(7) If the drawing scale is  $\dots\dots\dots$  1 , this expresses minimization.

"South - Suez - Multi. 2021" ( > or = or < or  $\geq$  )

(8) The numbers 1 , 2 , 6 and  $\dots\dots\dots$  are proportional.

"Port Said - Port Said - 2020" ( 2 or 6 or 8 or 12 )

(9) 20 % of 500 =  $\dots\dots\dots$

"Obour - Kalyoubia - Multi. 2021"

( 10 or 100 or 250 or 480 )

(10) If 20 % of a number is 80 , then the number =  $\dots\dots\dots$

"Heliopolis - Cairo - 2020" ( 16 or 40 or 400 or 1 600 )

(11) If the price of some goods is L.E. 256 and the price became L.E. 192 during the discount , then the percentage of the discount equals  $\dots\dots\dots$

"Kafr El-Sheikh - Kafr El-Sheikh - 2019" ( 16 % or 25 % or 33 % or 75 % )

(12) A man distributes L.E. 200 between two persons in the ratio 2 : 3 , then the share of the first = L.E.  $\dots\dots\dots$

"Edcu - Beheira - Multi. 2021"

( 20 or 30 or 80 or 120 )



(13) A trader sold some goods by losing percentage 20 % , then the percentage of the selling price was ..... % "Ashmoun - Monofia - 2020"

( 20 or 80 or 100 or 120 )

(14) 20 % of a number = ..... % of half the same number.

"Dakahlia - Dakahlia - 2019" ( 10 or 20 or 30 or 40 )

(15) A merchant sold goods with profit 15 % , if the cost price 20 000 pounds , then the selling price = .....

"Waqf - Qena - Multi. 2021"

( 23 000 or 15 000 or 2 300 or 150 )

(16) If  $\frac{x}{5} = 40\%$  , then  $x =$  .....

"South - Suez - 2019"

( 2 or 4 or 5 or 8 )

(17) If the real length is 6 m. and the drawing length is 6 cm. , then the drawing scale is .....

"Aswan - Aswan - 2020"

( 1 : 10 or 1 : 100 or 1 : 500 or 1 : 1 000 )

(18) If  $\frac{2}{7} = \frac{x-3}{21}$  , then  $x =$  .....

"Souhag - Souhag - 2020"

( 3 or 6 or 9 or 12 )

(19) If  $\frac{4}{6} = \frac{8}{x}$  , then  $x + 2 =$  .....

"Belbies - Sharkia - 2019"

( 16 or 15 or 14 or 12 )

(20) If Adel scored 13 marks from 20 marks in an exam , then the percentage of the scored mark = .....

"Kafr EL-Sheikh - Kafr EL-Sheikh - 2020"

( 65 % or 13 % or 20 % or 0.65 % )

**2 Complete the following :**

( 1 ) The proportion is .....

"Rashid - Beheira - 2019"

( 2 ) Drawing scale =  $\frac{\text{.....}}{\text{.....}}$

"Aswan - Aswan - 2019"

( 3 ) From the properties of the proportion , the product of the extremes = the product of the .....

"Souhag - Souhag - 2019"

( 4 ) If the drawing scale  $> 1$  , then this expresses .....

"Dokki - Giza - 2020"

( 5 )  $1 - (15\% + 45\%) =$  ..... %

"South - Ismailia - 2019"

( 6 ) The third proportional of the numbers : 0.8 , 4.8 and 12 is .....

"Gharbia - Gharbia - 2020"



## General Exercise

- (7) An edifice of height 12 metres, its shade at a moment was 4 metres, a tree is neighbored to it and its shade is 2 m. at the same moment, then the height of the tree = ..... m "Kafr El-Sheikh - Kafr El-Sheikh - 2020"
- (8) The real length of an insect is 0.3 mm. and its length in a picture is 4.5 cm., then the drawing scale = ..... : ..... "Menia - Menia - 2019"
- (9) If 6, 8, 3,  $x$  are in proportion, then  $x$  = ..... "Damietta - Damietta - 2020"
- (10) Hasnaa drew a picture for Omar with drawing scale 1 : 40, if the real height of Omar is 160 cm., then the height of Omar in the picture = ..... cm. "Banha - Kalyoubia - 2019"

### 3 Answer the following :

- (1) A tradesman bought a charge of apple with L.E. 20 000, then he found that a part of charge was damaged so he sold the remains with L.E. 18 000, find the percentage of his loss. "Damietta - Damietta - 2020"
- (2) A man put 3 000 L.E. in a bank with an interest 10 % Calculate the sum of the money after a year. "Omrania - Giza - 2020"
- (3) Two persons started a commercial business, the first paid L.E. 5 000 and the second paid L.E. 8 000 At the end of the year, the profit was L.E. 3 900 Calculate the share of each of them from the profit. "Banha - Kalyoubia - 2019"
- (4) A picture of a tree is drawn with a drawing scale 1 : 100, if the real height of the tree is 8 m., find its length in the picture. "Luxor - Luxor - 2019"
- (5) A trader bought a TV set by L.E. 4 500 and sold it with profit 10 % Find the selling price. "Dakahlia - Dakahlia - 2019"
- (6) Khaled bought a flat for L.E. 150 000, he sold it at 5 % loss. Calculate the selling price. "Aswan - Aswan - 2020"



- (7) Three persons shared in business. The first paid 15 000 pounds , the second paid 25 000 pounds and the third paid 20 000 pounds. At the end of the year the net profit was 5 520 pounds. Calculate the share of each of them. "Gharbia - Gharbia - 2019"
- (8) Find the cost price of goods sold for 21 275 pounds with profit percentage 15 %. "Omrانيا - Giza - 2019"
- (9) Dina bought a mobile for 1 800 L.E. with a discount 10 % Calculate the price of the mobile before the discount. "Maghagha - Menia - 2020"
- (10) Three persons participated in a commerce , the first paid L.E. 1 500 , the second paid L.E. 2 000 and the third paid L.E. 2 500 , at the end of the year the loss is L.E. 1 200 Find the share of each of them from loss. "Maadi - Cairo - 2019"
- (11) A company for selling the electric sets. It shows TV set for L.E. 2 100 , if the percentage of the profit is 12 % Find the buying price of TV set. "Rashid - Behiera - 2019"
- (12) If the length of the Suez Canal on a map of drawing scale 1 : 1 100 000 is 15 cm. , find its real length in km. "Montaza - Alexandria - 2020"
- (13) Mona bought a TV set with discount 20 % from the declared price which was 2 500 pounds. Find its price after discount. "Ashmoun - Monofia - 2020"
- (14) A photo was taken for an insect by enlargement ratio 100 : 1 , if the real length is 0.8 cm. Find the length in the picture. "Omrانيا - Giza - 2019"
- (15) A man died and left a piece of land for building its area is 17 kirats , he recommended for building on orphan house on area equals 5 kirats , the remainder is distributed between his son and his daughter in the ratio 2 : 1 , calculate the share of each of them from the land. "Souhag - Souhag - 2020"



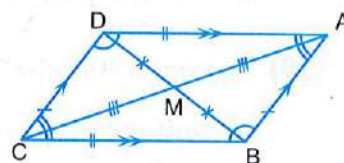
# Summary of unit 3



- **The parallelogram** : is a quadrilateral in which each two opposite sides are parallel.
- **The rectangle** : is a parallelogram with a right angle.
- **The rhombus** : is a parallelogram in which two adjacent sides are equal in length.
- **The square** : is a parallelogram with a right angle and two adjacent sides are equal in length.

## Properties of the parallelogram

- 1 Each two opposite sides are equal in length.
- 2 Each two opposite angles are equal in measure.
- 3 The sum of measures of each two consecutive angles is  $180^\circ$
- 4 The two diagonals bisect each other.



### A parallelogram is

#### a rectangle

If :

- One of its angles is right.

or

- Its two diagonals are equal in length.

#### a rhombus

If :

- Two adjacent sides are equal in length.

or

- Its two diagonals are perpendicular.

#### a square

If :

- One of its angles is right and two adjacent sides are equal in length.

or

- One of its angles is right and its diagonals are perpendicular.

or

- The two diagonals are equal in length and perpendicular.

or

- Two adjacent sides are equal in length and its diagonals are equal in length.



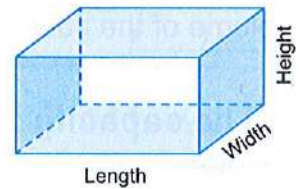
**A pattern :** is a sequence of symbols or figures arranged according to a certain system or rule.

**Pattern unit :** In visual patterns , usually you can find a unit which is repeated several times.

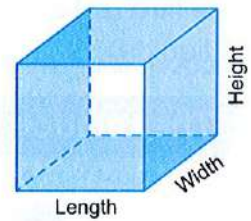
**Solids**

Any object that occupies a room in the space is called a **solid**.

- **The cuboid** has **12** edges , **8** vertices , **6** faces. and **3** dimensions : **length** , **width** and **height**.

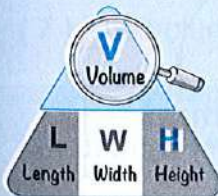


- **The cube** has **12** edges , **8** vertices , **6** faces all these faces are congruent squares and **3** equal dimensions.

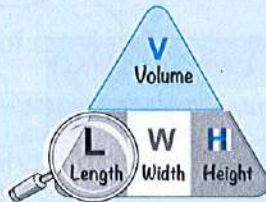


The number of **units** which a solid consists of is called **the volume** of the solid.

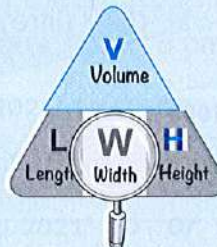
**Volume of the cuboid**



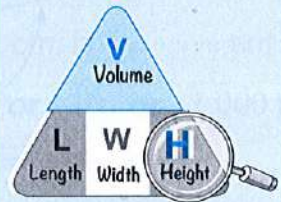
$$V = L \times W \times H$$



$$L = \frac{V}{W \times H}$$

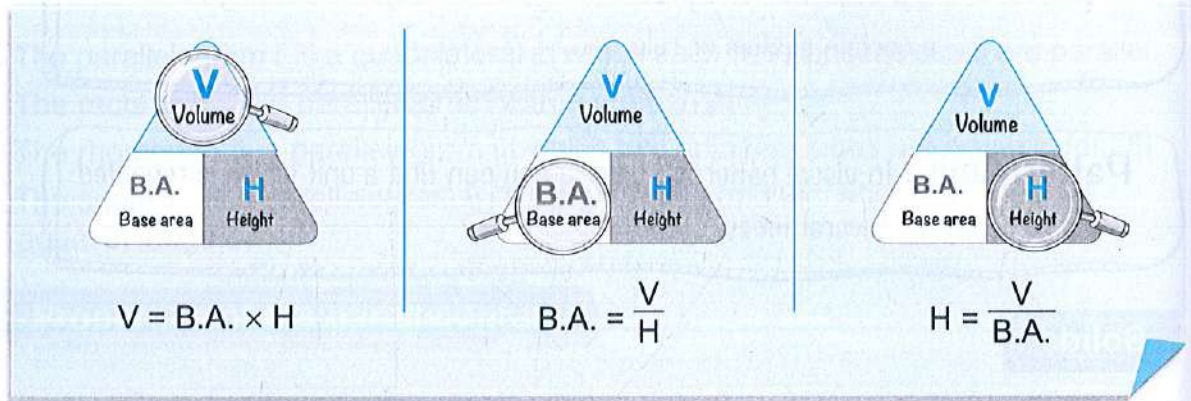


$$W = \frac{V}{L \times H}$$



$$H = \frac{V}{L \times W}$$





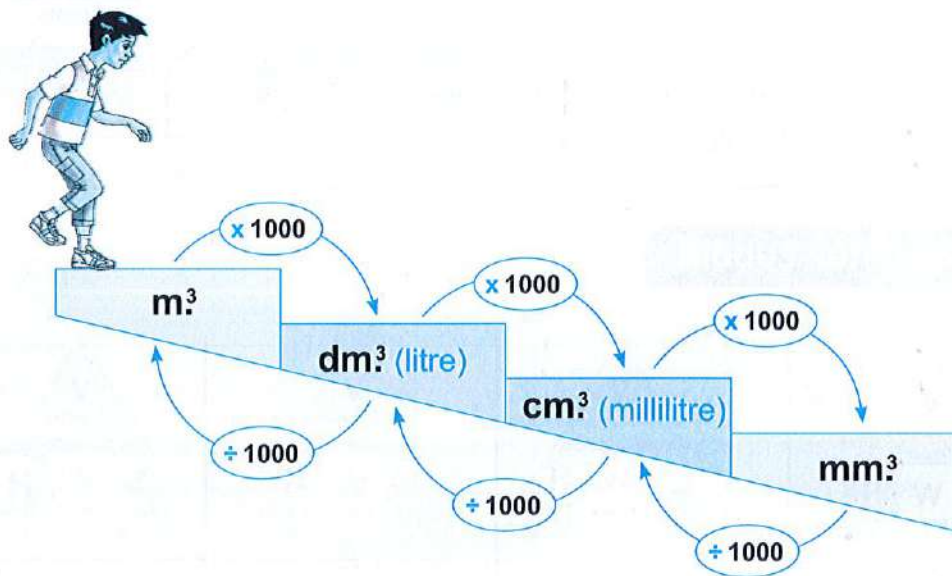
### Volume of the cube

Volume of the cube = edge length  $\times$  itself  $\times$  itself

**The capacity :** It is the volume of the inner space of a hollow solid.

The litre (L.) and millilitre (mL.) are two units for measuring capacity or the volume of liquids.

### The relation between the units of volume





# General Exercise on Unit Three

"Collected from directorates' exams"

Answer the following questions :

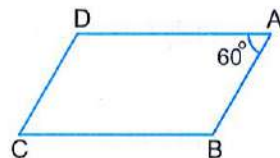
1 Choose the correct answer from those given :

(1) In the opposite figure :

ABCD is a parallelogram where  $m(\angle A) = 60^\circ$

, then  $m(\angle B) = \dots\dots\dots$

"Middle - Cairo - Multi. 2021" (  $30^\circ$  or  $60^\circ$  or  $90^\circ$  or  $120^\circ$  )

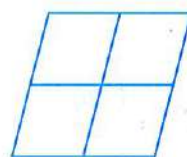


(2) In the opposite figure :

The number of parallelograms

which can be obtained is  $\dots\dots\dots$

"Shebin El-Koum - Monofia - 2019" ( 4 or 5 or 7 or 9 )



(3) The diagonals are perpendicular and equal in length in  $\dots\dots\dots$

"Deir Mawas - Menia - Multi. 2021"

( rectangle or square or rhombus or parallelogram )

(4) The four sides are equal in length in  $\dots\dots\dots$  "Arment - Luxor - Multi. 2020"

( triangle or rhombus or parallelogram or trapezium )

(5) If one of the angles of a parallelogram is a right angle

, then it is called  $\dots\dots\dots$

"Middle - Alexandria - 2021"

( a square or a rectangle or a rhombus or a triangle )

(6) The number of edges of the cube  $\dots\dots\dots$  the number of faces of the cuboid.

"EL-Tur - South Sinai - 2019" (  $>$  or  $<$  or  $=$  or  $\leq$  )

(7) The volume of a cuboid of dimensions 7 cm., 5 cm., 2 cm. is  $\dots\dots\dots$   $\text{cm}^3$ .

"EL-Hamoul - Kafr EL-Sheikh - Multi. 2021" ( 70 or 56 or 16 or 7 000 )

(8) If the edge length of a cube is 6 cm. , then its volume =  $\dots\dots\dots$   $\text{cm}^3$ .

"EL-Khalifa and EL-Mokattam - Cairo - Multi. 2021" ( 6 or 72 or 108 or 216 )

(9) If the volume of a cube =  $125 \text{ cm}^3$  , then its base area =  $\dots\dots\dots$

"Souhag - Souhag - 2020" (  $25 \text{ cm}^2$  or 25 cm. or  $5 \text{ cm}^2$  or 5 cm. )



General Exercise

- (10) A wooden box in the form of a cube , its external volume is  $1\,000\text{ cm}^3$  and its capacity is  $729\text{ cm}^3$  , then the volume of wood of the box = .....  $\text{cm}^3$   
 "Port Said - Port Said - 2019" ( 0.729 or 1 729 or 271 or 729 000 )
- (11) 1 Litre = .....  $\text{cm}^3$   
 "Awseem - Giza - Multi. 2021" ( 10 or 100 or 1 000 or 2 000 )
- (12)  $0.3\text{ m}^3 =$  .....  $\text{dm}^3$   
 "South - Ismailia - 2019" ( 3 000 or 300 or 30 or 3 )
- (13) The sum of measures of any two consecutive angles of a parallelogram = .....  $^\circ$  "Qena - Qena - Multi. 2021" ( 120 or 140 or 160 or 180 )
- (14) Description of the pattern  $\nabla \bigcirc \square \nabla \bigcirc \square$  is repetition for .....  
 "Montaza - Alexandria - 2020" (  $\nabla$  or  $\nabla \square$  or  $\nabla \bigcirc \square$  or  $\bigcirc$  )
- (15) If the volume of a cuboid is  $400\text{ cm}^3$  and its base with length 8 cm. and width 5 cm. , then its height = ..... cm.  
 "West - Cairo - Multi. 2021" ( 6 or 10 or 12 or 20 )
- (16)  $4.250\text{ cm}^3 =$  .....  $\text{mm}^3$   
 "Kafr El-Sheikh - Kafr El-Sheikh - 2019" ( 4 250 or 42.5 or 0.425 or 4.25 )
- (17) ABCD is a parallelogram if  $m(\angle A) = 50^\circ$  , then  $m(\angle C) =$  .....  
 "Kafr Saqr - Sharkia - Multi. 2021" (  $50^\circ$  or  $70^\circ$  or  $130^\circ$  or  $60^\circ$  )
- (18) 4.6 litres = ..... mL.  
 "Qena - Qena - 2019" ( 46 or 460 or 4 600 or 46 000 )
- (19)  $12\text{ dm}^3 =$  ..... litres.  
 "Rahmania - Beheira - Multi. 2021" ( 120 or 1 200 or 12 000 or 12 )
- (20)  $16\,000\text{ cm}^3 =$  ..... litres.  
 "Luxor - Luxor - 2019" ( 1.6 or 16 or 160 or 0.16 )

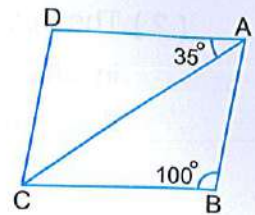
**2** Complete the following :

- ( 1 ) The next figure in the following pattern  $\square \square \square$  is .....  
 "Deshna - Qena - 2020"
- ( 2 )  $\triangle \bigcirc \triangle \triangle \bigcirc \bigcirc \triangle \triangle \triangle$  ..... (in the same pattern)  
 "Souhag - Souhag - 2019"
- ( 3 ) A rectangle will be a square if its diagonals are .....  
 "East Mansoura - Dakahlia - 2020"



(4) In the opposite figure :

ABCD is a parallelogram  
 , then  $m(\angle ACD) = \dots\dots\dots^\circ$



"West - Alexandria - 2019"

(5) The quadrilateral which each two opposite sides are parallel and equal in length is .....

"Nasr City - Cairo - 2020"

(6) If the perimeter of one face of a cube is 24 cm. , then its volume is .....

"Nasr City - Cairo - 2019"

(7) The volume of a cuboid is  $64 \text{ cm}^3$  and the area of its base is  $16 \text{ cm}^2$   
 , then its height = .....

"Kafr EL-Sheikh - Kafr EL-Sheikh - 2019"

(8) If the sum of lengths of all edges of a cube is 132 cm. , then its volume = .....

"Gharbia - Gharbia - 2019"

(9) The area of the base of the cuboid = .....

"South - Suez - 2020"

(10)  $1.5 \text{ litre} + 0.35 \text{ dm}^3 + 150 \text{ cm}^3 = \dots\dots\dots \text{ cm}^3$

"Dakahlia - Dakahlia - 2019"

(11) The diagonals are perpendicular and not equal in length in .....

"EL-Dokki - Giza - 2020"

(12) The volume of a cuboid with a squared base of side length 6 cm. and its height is 10 cm. = .....

"Rashid - Beheira - 2019"

(13) The rhombus whose one of its angles is right is called .....

"Gharbia - Gharbia - 2020"

(14) Diagonals are equal in length in each of ..... and .....

"Luxor - Luxor - 2019"

(15) A cuboid of base area is  $16 \text{ cm}^2$  and its height is 5 cm.  
 , then the volume = .....

"Aswan - Aswan - 2020"

3 Answer the following :

(1) In the opposite figure :

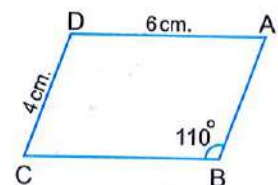
ABCD is a parallelogram , find :

[a]  $m(\angle D)$

[b]  $m(\angle A)$

[c] The length of  $\overline{AB}$

[d] The perimeter of the shape ABCD

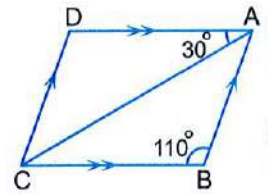


"Port Said - Port Said - 2019"



- (2) The opposite figure shows a parallelogram in which  $m(\angle B) = 110^\circ$  and  $m(\angle DAC) = 30^\circ$   
Find :  $m(\angle D)$  ,  $m(\angle BAC)$  and  $m(\angle ACD)$

"Belbies - Sharkia - 2019"



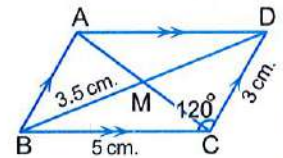
- (3) In the opposite figure :

ABCD is a parallelogram in which  
 $m(\angle BCD) = 120^\circ$  ,  $CD = 3$  cm. ,  
 $BC = 5$  cm. ,  $BM = 3.5$  cm.

Find : [a]  $m(\angle BAD)$ .

[b] The perimeter of the triangle DAB.

"Ismailia - Ismailia - 2020"



- (4) The ratio between the measures of two consecutive angles in a parallelogram is 4 : 5 Find the measure of each of them.

"Kafr EL-Sheikh - Kafr EL-Sheikh - 2019"

- (5) Which is greater in volume , a cuboid whose dimensions are 12 cm. , 10 cm. and 8 cm. or a cube of edge length 10 cm. ? "Maadi - Cairo - 2019"

- (6) A building worker used 1 500 bricks to build a wall , calculate the volume of the wall in  $m^3$  if the brick is in the shape of a cuboid of dimension 25 cm. , 12 cm. , 6 cm. "Banha - Katyoubia - 2019"

- (7) The volume of a cuboid is  $54$   $cm^3$  , its base is square shaped of side length 3 cm. , calculate its height. "Omrania - Giza - 2020"

- (8) A box in the shape of a cuboid with dimensions 36 cm. , 42 cm. and 24 cm. If it is filled with small cubes of edge length 6 cm. , find the number of these cubes. "Ashmoun - Monofia - 2020"

- (9) A metallic cube of edge length 12 cm. , it needs to be converted into ingots in the shape of cuboid each of them of dimensions 3 cm. , 4 cm. and 6 cm. Calculate the number of ingots that are obtained.

"Gharbia - Gharbia - 2019"

- (10) A container has 12 litres of oil , it is wanted to put it in small bottles the capacity of each of them is  $400$   $cm^3$  , calculate the number of bottles which needed. "Damietta - Damietta - 2020"



- (11) A swimming pool in the shape of a cuboid whose internal dimensions are 40 m. , 30 m. and 1.8 m. Find its capacity in litres. "Heliopolis - Cairo - 2020"
- (12) A cube shaped vessel , its internal edge is 30 cm. and it is filled with oil.  
[a] Calculate the capacity of the vessel.  
[b] If the price of one litre of oil is 9.5 pounds. Calculate the price of all oil.  
"East Mansoura - Dakahlia - 2020"
- (13) A cuboid tin with inner dimensions 2 dm. , 3 dm. and 4 dm. was full of honey. Calculate the price of honey , given that the price of one litre is L.E. 20  
"Menia - Menia - 2019"
- (14) 10 litres of water were poured in a vessel in the shape of a cuboid its base is a square base of side length 25 cm. Find height of the water in the vessel.  
"South - Ismailia - 2019"
- (15)  $8\,400\text{ cm}^3$  of water is poured into a vessel in the shape of cuboid with internal dimensions 20 cm. , 35 cm. and 45 cm. Find the volume of water needed to be added for the vessel becomes filled with water completely.  
"Montaza - Alexandria - 2020"



# Summary of unit 4



## Kinds of statistical data

### 1 Descriptive data :

These are data written in the form of **discription of the case** of the persons in the society as : **name** , **qualification** , **gender** , **marital status** , ...

### 2 Quantitative data :

These are data written in the form of **numbers** to express a certain phenomenon as : **age** , **weight** , **height** , ...

## Remarks

- ① The difference between the maximum and the minimum value of the given data is called **the range of this data**.
- ② The difference between the upper limit and the lower limit of the set is called **the length of this set**.
- ③ To find the number of sets, we find the quotient of  $\frac{\text{the range}}{\text{the length of the set}}$   
If the quotient is a mixed number, we take the next whole number.
- ④ Centre of the set =  $\frac{\text{lower limit} + \text{upper limit}}{2}$

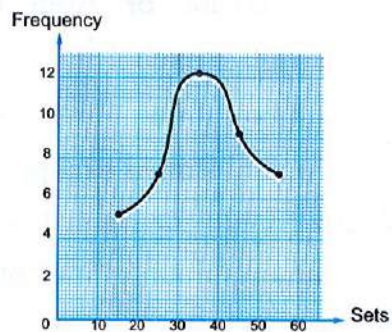


**Representing the statistic data by the frequency curve****For Example**

The following table shows the frequency distribution of marks of 40 pupils in the mathematics exam :

Sets	10 –	20 –	30 –	40 –	50 –	Total
Frequency	5	7	12	9	7	40

Represent these data by the frequency curve.

**Solution**

Frequency curve of the marks of pupils



# General Exercise on Unit Four

"Collected from directorates' exams"

Answer the following questions :

**1** Choose the correct answer from those given :

- (1) From the descriptive data is ..... "Omrana - Giza - 2020"  
( blood species **or** height **or** weight **or** age )
- (2) From the quantitative data is ..... "Nasr City - Cairo - 2019"  
( favorite colour **or** name **or** age **or** blood type )
- (3) ..... is not a quantitative data. "Sheikh Zayed - Giza - Multi. 2021"  
( Favorite colour **or** Area **or** Volume **or** Length )
- (4) The following data are descriptive except ..... "Maghagha - Menia - 2020"  
( colour **or** birth place **or** age **or** name )
- (5) All of the following data are quantitative except .....  
"Semsta - Beni Suef - Multi. 2021" ( age **or** height **or** birth place **or** weight )
- (6) If the values in the frequency distribution lies between (40 , 90) , then the range of this distribution = .....  
"Kafr El-Sheikh - Kafr El-Sheikh - 2019" ( 130 **or** 50 **or** 80 **or** 180 )
- (7) The range of the values (3 , 8 , 2 , 5) is .....  
"North - Port Said - Multi. 2021" ( 7 **or** 6 **or** zero **or** one )
- (8) The range of the values 50 , 90 , 35 and 20 is .....  
"Deshna - Qena - 2020" ( 10 **or** 20 **or** 30 **or** 70 )
- (9) If the marks of 6 students in one exam are 29 , 33 , 57 , 40 , 36 and 49 , then the range of these marks = .....  
"West - Alexandria - Multi. 2021" ( 32 **or** 33 **or** 28 **or** 86 )
- (10) If the range is 40 and the length of the set is 5 , then the number of sets = .....  
"Gharbia - Gharbia - 2019" ( 5 **or** 6 **or** 7 **or** 8 )

**2** Complete the following :

- (1) The types of the statistical data are ..... and .....  
"Ashmoun - Monofia - 2020"



(2) Age , birth date and weight are called ..... data.

"Dakahlia - Dakahlia - 2019"

(3) The difference between the maximum value and the minimum value is .....

"Omrania - Giza - 2019"

(4) The number of sets =  $\frac{\text{the range}}{\dots\dots\dots}$

"South - Suez - 2020"

(5) The lower limit of a set = 10 and the upper limit = 30 , then its centre = .....

"Belbies - Sharkia - 2019"

(6) In the following table :

Sets	10 -	20 -	30 -
Frequency	4	6	2

The centre of the set (10 -) = .....

"Aswan - Aswan - 2020"

(7) The following table shows the marks of 40 students in one test , then the number of students who got less than 30 marks = .....

Marks	10 -	20 -	30 - 40
Number of students	10	13	17

"Kalyoubia - Kalyoubia - 2020"

(8) The following table shows the marks of 50 students in one month in maths :

Marks	10 -	20 -	30 -	40 - 50	Total
Number of students	5	15	20	10	50

Then the number of students whose marks are less than 40 is ..... students.

"Port Said - Port Said - 2020"

**3** Answer the following :

(1) The following table shows the number of hours which the pupils of a class spend daily in front of the computer :

Number of hours	- 1	- 2	- 3	- 4	- 5	- 6	Total
Number of pupils	8	10	12	6	4	2	42

Represent this data by the frequency curve.

"South - Suez - 2019"



- (2) The following table shows marks of 100 students in one month in math test :

Marks	10 –	20 –	30 –	40 – 50	Total
Number of students	15	30	40	15	100

Draw the frequency curve of this distribution.

"Menia – Menia – 2019"

- (3) The following table shows the distribution of the weekly wages of 60 workers in a factory :

Weekly wages	50 –	60 –	70 –	80 –	90 –	100 –	110 –	Total
No. of workers	6	8	12	18	10	4	2	60

[a] Draw the frequency curve of the distribution.

[b] Find the percentage of workers whose weekly wages are 100 L.E. and more.

"East Mansoura – Dakahlia – 2020"

- (4) The following table shows the marks of 48 students in an English examination :

Marks	0 –	5 –	10 –	15 –	20 –	Total
Number of students	4	8	18	12	6	48

[a] Draw the frequency curve for this distribution.

[b] How many students who record less than 10 marks ?

"Ismailia – Ismailia – 2020"

- (5) The following table shows the number of hours which spent by 40 pupils to study their lessons :

Number of hours	1 –	2 –	3 –	4 –	5 – 6	Total
Number of pupils	6	X	8	12	11	40

[a] Find the value of X.

[b] Represent these data using the frequency curve.

"Banha – Kalyoubia – 2019"